

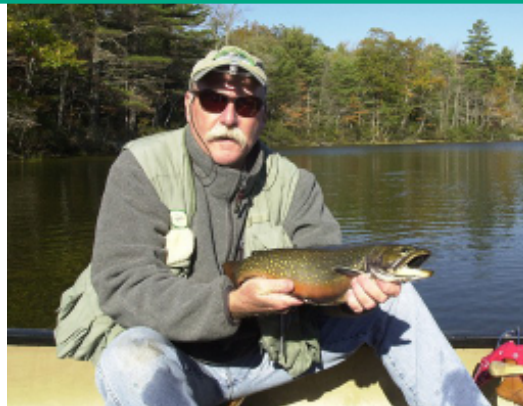


# MAINE DEPARTMENT OF INLAND FISHERIES & WILDLIFE FISHERIES & HATCHERIES ANNUAL REPORT

March 2005

[www.mefishwildlife.com](http://www.mefishwildlife.com)

This newsletter is intended to provide readers with a glimpse into some of the many projects that our Fishery and Hatchery staff are involved with. Contained in this report, are highlights from each of the seven Fishery Regions, our Fishery Research Unit in Bangor, and the Hatchery Section. We hope it gives you better insight into what we do, and we welcome your comments.



*John Patriquin releases a brook trout from a central Maine water.*

## Invasives, The Threat Continues

Illegal stocking of both private and public waters is the biggest threat facing fisheries managers and Maine anglers. Native and nonnative fish introductions destroy popular recreational fishing opportunities, which generate in excess of 300 million dollars to the State's economy annually. Maine's fisheries staff has been spending an increasing amount of time "responding and reacting" to these senseless introductions. This new and growing workload will mean that fewer Departmental resources will be available for the maintenance of existing management programs, let alone the development of new fishery management programs and initiatives.

As you read through the newsletter you will find just a few examples of recent illegal introductions and the problems they have created. It is clear that no corner of Maine is safe from the threat of illegal introductions. Furthermore, it is extremely difficult to deal with an introduction once it has taken place. The ongoing epidemic of illegal fish stockings represents the greatest threat to Maine's indigenous species.

The apprehension and successful prosecution of those individuals responsible for illegal introductions is a difficult proposition. Recently, that all changed.

### Illegal Fish Traders Get Harsh Penalties

In January Michael Zombik of Massachusetts was sentenced to 6 months incarceration and 2 years supervised release for violations of the Lacey Act. His company, Michael's Wholesale Bait of West Springfield, Mass received

a \$60,000 fine and 3 years probation for violating the Lacey Act. The Lacey Act makes it a federal crime to engage in the interstate commerce of fish taken illegally. The sentencing marks the end of long term investigation that started in May of 2000. The Maine Warden Service, U.S. Fish and Wildlife Service, Massachusetts Environmental Police, and New York Department of Environmental Conservation formed a partnership to investigate the unlawful interstate sale and purchase of live game fish being taken from the wild and commercially sold. The investigation began when Paul Yang of Brooklyn, NY traveled to Maine to purchase live wild game fish from an undercover Maine Warden Service Investigator. The subsequent investigation revealed Mr. Yang was buying live game fish from Michael's Wholesale Bait, Inc. and reselling live fish to restaurants and fish markets in New York's China Town. As a result of this investigation, Mr Yang paid a \$2,000 fine for Lacey Act violations, a bait dealer in York County paid a \$2,500 fine for illegally importing live bait, a doctor in Cumberland County paid a \$7,000 fine as well as a \$1,500 charge for pond reclamation for importing live largemouth bass to stock his private pond.

Maine has some of the most stringent fish health rules in the U.S. in order to protect the state's sensitive ecosystem, many of

which still have indigenous brook trout populations. The rules are in place to protect Maine fish stocks from disease and parasites that might impact members of the salmon and trout family. Hopefully, these fines will send a message to those considering any illegal fish stocking or importations.



**Trouble by  
the bucketful.**

Please help fight illegal stocking.

**1-800-ALERT-US**

There is a \$2,000.00 reward  
for information leading to  
a conviction.



## Proposed Statewide Changes to Recreational and Commercial Smelt Management

Despite their relatively small size and low profile, rainbow smelt are of great importance to anglers and fisheries statewide. They are the only inland fish species to provide such a variety of uses and benefits including: recreational sport fishing opportunities, a commercial bait fishery, a favored bait for anglers targeting other sportfish, a popular food fish, and a primary forage fish for both coldwater and warm water fishes.

Our recently adopted smelt species plan identified the need for additional smelt conservation to meet the current and future demands on this valuable fishery resource. As a result, the Department explored a wide range of possible conservation opportunities. Additional input was solicited from the public (representing various smelt-user groups), and the Fish and Wildlife Advisory Council. Based on these discussions, eleven conservation measures are being proposed. The measures and rationale are listed below.

**1) Establish a 24-inch maximum hoop size for dip-nets.**

Rationale: Provides additional opportunity for escapement and better distributes the catch among anglers, particularly on smaller streams.

**2) Require smelt dealers to use commercially manufactured graders.**

Rationale: Many dealers are using "home-made" graders, which are ineffective and result in excessive, and unnecessary mortality to juvenile smelt with no market value.

**3) Commercial anglers will be required to report smelt catch information to MDIFW.**

Rationale: Although this type of data is not always accurate, it provides a good tracking tool for monitoring fishery changes over time that would allow MDIFW to better manage and understand our commercial smelt fisheries.



*Three different age classes of rainbow smelt.*

**4) Hook & Line Anglers/Dip-netters (without a commercial license) will only be allowed to keep 5-dozen smelt alive; the balance of their limit would have to be killed.**

Rationale: The illegal selling of bait has been a problem in some areas of the State. This rule change allows the Warden Service to more effectively enforce existing laws pertaining to the illegal sale of smelts, while still providing anglers a reasonable number of live smelt for personal bait needs.

**5) Establish a statewide midnight closure for dip-netting.**

Rationale: Protects the resource by giving smelt an opportunity to spawn without interference; provides some enforcement benefits for the Warden Service; and reduces many of the social issues associated with property owners and dip-netting activities.

**6) Smelt dealers only allowed to dip-net 2 quarts of smelt during the spring spawning season. (The limit is currently 8 quarts.)**

Rationale: Provides additional protection of the resource during a critical part of the smelt's life stage, and improves equity among the user groups.

**7) Maintain existing system to list waters open to commercial smelting.**

Rationale: This listing allows MDIFW to efficiently respond to and manage for changes in our smelt populations by removing and adding waters annually as needed.

**8) Conduct a comprehensive review of statewide smelt waters, and identify waters that are important for landlocked salmon and lake trout.**

Rationale: Insure compliance/consistency with the goals & objectives of the smelt species plan, while also providing an opportunity to recognize additional commercial opportunities. The completed review has led to the closure of 11 commercial smelt waters, and the creation of 60 new commercial smelt waters for 2005.

**9) Educate and encourage dip-netters to avoid walking on smelt eggs during the spawning season.**

Rationale: Spawning is a critical life stage of any species, and dip-netting activity has been shown to cause high mortality of deposited smelt eggs.

**10) Investigate the feasibility (MDIFW + Commercial smelters) of requiring graders/grader panels installed in the bottom of commercial drop nets. If successful this may be a future Statute change.**

Rationale: Excessive and improper handling of juvenile smelt, as well as, exposure to extreme temperatures results in high mortality of juveniles. A built-in grading system would allow young smelt to escape without handling or removal from the water.

**11) MDIFW pathologist to investigate causes of commercial/retail smelt mortalities.**

Rationale: This work will lead to the development of a resource guide for handling, transporting, and holding smelt to reduce mortality.

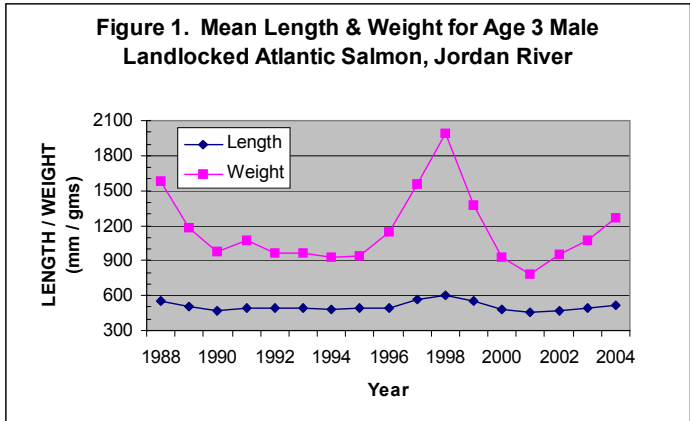
To date, we have presented the above proposals to the Commissioner's Office, the Fish and Wildlife Advisory Council, the Smelt Working Group, and a number of commercial smelt dealers with encouraging results. Based on this process, we have already made modifications to the list of commercial smelt waters for the 2005 season. Over the next few months we hope to solicit additional input on these proposals from the general public. If our readership has any comments or concerns regarding the proposed changes then please feel free to contact Jim Pellerin at the Gray Regional Office (657-2345, ext 111).

Fishery Region A

Sebago Lake...On The Road To Recovery?

Annual monitoring of adult salmon that enter the Jordan River fish collection facility each November indicates a steady improvement in salmon growth for the third consecutive year. For example, three-year old male salmon observed in 2004 were 1 inch longer and almost a ½ pound heavier than observed in 2003 (Figure 1). Furthermore, about 20% of the run in 2004 consisted of 3 pound or larger salmon, the largest being 4.7 pounds! Only two 3-pound salmon were observed during the entire previous 4-year period.

Although the togue, on average, are not as large as they were back in the late 1980's, the lake continues to give up some 12 to 18 pounders every year. An



observed trend in declining mean length and weight appears to have stabilized. Harvested togue averaged 20.2 inches long and 2.67 lbs in 2004.

A survey of Sebago's smelt population in September of 2004 indicates that smelt stocks are increasing. Although the smelt population has not recovered to levels that can sustain increased stocking, we have planned for the possibility that increased salmon stocking may be warranted within the next few years if observed improvements in the fishery continue.

South Pond Offers More Than Expected

Fall netting on South Pond produced some of the most handsome salmon observed on any regional water sampled this past fall. Captured adult salmon averaged 20" long and weighed 3.2 pounds, the largest measured 24 inches long and weighed 5.2 pounds. Observed salmon growth is some of the best we've seen on this small, 284-acre pond. While South Pond offers some excellent size-quality salmon, the

salmon population is relatively small and anglers should not expect fast action.



Fishery biologist Jim Pellerin holds a quality landlocked salmon from South Pond.

Thompson Lake (Oxford) Won't Give Up It's Salmon

Anglers reported slower fishing for the 2004 open water season, raising some concerns that the salmon fishery was being over-fished.

Netting results for 2004 suggest the salmon are in very good condition (see table). Furthermore, an abundance of salmon was netted, including a high percentage of larger, older salmon that were absent from our 2003 netting. In fact, we caught more salmon per net-hour this fall than in any year since 1999. In addition, the 2004 salmon were the second largest in the last 6 years, based on mean length and weight.

Mean Length, Weight, Condition, and LLS/Net Hr for Landlocked Salmon Netted at Thompson Lake, 1999-2004.

Mean	Year					
	1999	2000	2001	2002	2003	2004
Length (in)	18.7	18.6	18.7	20.4	19.0	19.6
Weight (lbs)	2.5	2.2	2.6	3.3	2.6	2.9
Condition (K)	1.05	0.91	1.08	1.06	1.04	1.04
LLS/Net Hr	0.45	0.18	0.27	0.43	0.31	0.57

Smelt sampling this past summer indicated juvenile smelt were very abundant, which may partially explain the unexpectedly slow fishing reported by anglers.

Auburn Lake (Auburn), The Best of the Best

Basin Pond Outlet Stream was again sampled in November of 2004 using electrofishing equipment to monitor the landlocked salmon fishery at Auburn Lake. Once again, the salmon were in exceptional condition, the largest fish sampled was a 4-year old female salmon that measured 24

inches long and weighed 6.5 pounds. Table 5 provides a summary of the recent sampling data, and for the 4<sup>th</sup> consecutive year Lake Auburn continues to be a top producer for trophy-size landlocked Atlantic salmon.



Quite a catch of salmon and togue at Auburn Lake.

Mean Length, Weight, and Condition of Adult Landlocked Salmon Netted at Basin Pond Outlet Stream, Auburn Lake.

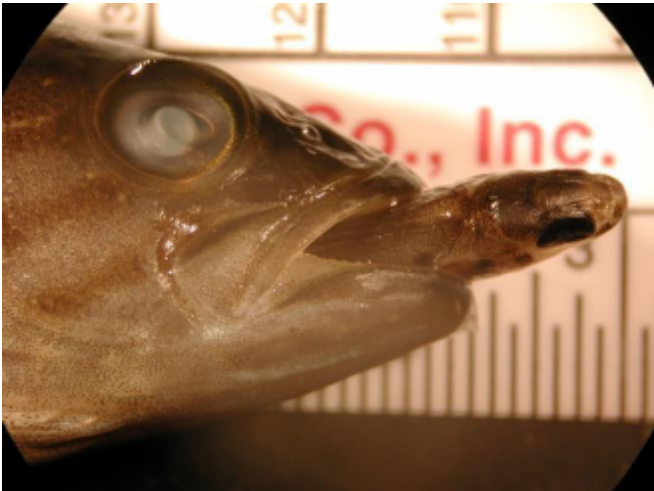
Mean	Year					
	1999	2000	2001	2002	2003	2004
Length (in)	18.7	18.6	18.7	20.4	19.0	19.6
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LLS/Net Hr	0.45	0.18	0.27	0.43	0.31	0.57



Invasive Fish in Region A

Two noteworthy illegal response efforts were undertaken in 2004. Mud puppies were eradicated from a private pond located in the Sebago Lake drainage. Mudpuppies were established through a baitfish introduction. Concerns of interactions with native species further down in the drainage prompted the eradication effort.

Regional staff spent most of a day and good part of one night on Cushman Pond (Lovell) investigating a purported smallmouth bass introduction in this trophy brook trout water. Electrofishing surveys, scuba, and stationary nets were deployed without success. It is our belief that very few bass were recently stocked. We plan to return next spring during the spawning season, when the bass will be more closely associated with the shoreline. If present we may deploy trap nets in an effort to remove the bass that were introduced.



Smallmouth bass with a brook trout fry in its mouth.

Fishery Region B

Region B Stream Surveys:

In the summer of 2004, Region B staff completed stream surveys in 9 towns. These surveys were undertaken as part of the Department's initiative to improve our database for moving water habitats and their fisheries. This important work is intended to document the existence of wild fisheries and/or to identify waters with the potential for holding stocked fish. To date about 30 % of the region has been surveyed to some degree. The results of 2004 surveys are shown in the table below.

These particular surveys are referred to as Level I surveys. They constitute a characterization of multiple habitat



conditions obtained while walking or canoeing a short section of a stream. They are a 'habitat snapshot' that gives us an indication of local conditions.

Streams surveys are undertaken in the later part of summer,

from late July through mid-September. During that time, water temperatures reach their annual maximum. Warm water is less able to hold dissolved gases like oxygen. For cold-water fish species, the combination of warm water and reduced oxygen levels cause stress and can potentially be fatal. If we find conditions that will support salmonids in late summer, we expect the habitat has the potential for sustaining cold-water fish over the remainder of the year.

We used stream-road crossings as the mid-point of our evaluation sites, which typically covered about 400 feet. Access to these sites was usually relatively easy. Using a culvert or other crossing structure allowed us to determine if the structure was affecting potential fish passage. Additionally, angling pressure generally revealed itself as trails or other signs of human presence. Finally, locations of all sites were easily referenced using a hand-held GPS.

Biologists collected data on basic water chemistry, in-stream habitat conditions, riparian habitat conditions, and biological community composition. Site maps were drawn, noting water depths, riffles, pools, undercut banks, stream-side vegetation, substrate types, presence of woody debris and signs of human activity and/or development. Then, if conditions allow, a single pass electro-fishing run was made. All fish and amphibians captured are identified and counted.

A Summary of Stream Surveys Completed in Region B

Town	Number of Streams Surveyed	Number of Crossings Surveyed	Number of Crossings With Salmonids
Camden	10	11	2
Rockport	20	45	10
Appleton	10	22	2
Union	16	20	6
Hope	11	13	7
Cambridge	10	19	3
Ripley	9	13	3
Harmony	19	27	7
St. Albans	20	32	8
9 Towns	125	202	48

Kimball Pond: Brook Trout strain Evaluation Project

Kimball Pond was trap netted in the spring and fall of 2004 to collect data as part of a larger study to evaluate the differences between 3 genetic strains of brook trout. The Kennebago strain, the Maine Hatchery strain, and a Hybrid (Kennebago X Maine Hatchery strain) trout were stocked in equal numbers and evaluated based on growth, survival, and return to anglers. In 2003, the study was limited to the first 2 strains, the Hybrid cross fish were added to the evaluation in 2004.

Brook trout are most vulnerable to trap netting as soon as the ice leaves the pond. This spring, although trap nets were set quickly after ice-out and fished for 20 days, only 7 trout were caught. In comparison, spring netting in 2003 yielded 310 brook trout. In 2003, over-winter survival rate for Maine Hatchery strain trout was 76%, more the than twice that for the Kennebago Strain (33%). Unfortunately, due to the low

capture rate of spring 2004, no meaningful over-winter survival rate can be determined for that year.

The fall trap net operation in 2004 was much more successful, with a total of 116 brook trout captured in 28 days. Nearly equal numbers of Kennebago strain (50) and the Hybrid Strain (47) were caught while only 5 Maine Hatchery strain trout were captured. The table below shows the growth and survival rates based on populations estimates for 2003-04.

Further information regarding the evaluation can be found at the Department website. Follow the fisheries links to the Ten-Forty Pond study. A final report, authored by Tim Obrey of the Fishery Research Section will be published at the conclusion of the study.



*A beautiful Maine brookie taken in 2004.*

**Kimball Pond:** Annual strain growth and survival rates for 2004 based on population estimates

Strain	Size at Stocking (inches)	Size After 1 year (inches)	Percent Survival Rate
Kennebago	6.4	11.7	13
Maine Hatchery (MHS)	8.3	10.2	2
Kennebago X MHS	8.3	12.1	20

#### Landlocked Salmon in Parker Pond (Mt. Vernon):

Over the years, the size quality of landlocked salmon in Parker Pond has varied. Recently, the increasingly slower salmon growth in the pond has been attributed to low smelt populations (the principal forage for salmon) and an over-abundance of salmon. A number of management changes have been implemented to address this situation.

For instance, salmon stocking was curtailed entirely in 1991, 1999 and 2000 to reduce the number of salmon in the lake, thereby decreasing predation on smelts. It was hoped that the lake's smelt population would recover to the extent that a salmon stocking program could be reinstituted. The salmon-stocking program was reinstituted in 2001, albeit at a

reduce rate of 400 fish per year 60% less than the historical rate of 1,000 salmon per year.

The department has also instituted regulation changes to facilitate the removal of salmon from the population, thereby reducing predation on smelt and accelerating an increase in the lake's smelt population. Regulations governing the harvest of



*Parker Pond salmon taken in the fall of 2004.*

salmon have been liberalized in the winter and summer fishing seasons. Consult your regulations booklet for the details.

Finally, smelt populations in Parker Pond historically used four tributaries for spawning. However, at present the majority of the smelt run is restricted to a single tributary. In an effort to bolster the smelt population in Parker Pond, numerous smelt egg transfers have been made into the stream. Furthermore, during the summer of 2004, biologists surveyed the tributaries to determine the possibility of rehabilitating the three other runs. Their findings indicated that habitat changes detrimental to successful smelt spawning had occurred in those brooks. With in-stream work, these streams could potentially support some smelt egg deposition again. In the survey, it was found that the single viable smelt tributary has some problems, too. The channel of this brook was over-widened by the 1987 flood. Each spring, many eggs are deposited in areas that quickly lose water after spring runoff. These eggs are 'left in the dry' and do not hatch. Surveys to plan work to re-confine the stream channel will take place during 2005. The actual work of narrowing the channel will take place as soon as possible following the development of the work plan.

Taken together, these management changes should result in improved salmon fishing in Parker Pond in the near future.

#### Northern Pike in Long Pond (Belgrade, Rome, Mt. Vernon):

The Northern Pike made its appearance in the Belgrade chain of lakes in the 1970's. These populations are firmly established in several area waters where they ultimately have had an impact on fisheries management.

Long Pond was once known for its trophy landlocked salmon fishing, making it the destination of many anglers over the years. Ice fishing was discontinued on the lake prior to 1980 to protect the valued salmon fishery.

In the winter of 2004, the first of three experimental seasons of ice fishing was implemented at Long Pond. This project will help us determine if the winter pike harvest will be sufficient to significantly reduce the impact of this species on the lake's salmon fishery. An estimated 3500 anglers fished the lake during the 2004 ice-fishing season. Approximately 505 pike were harvested from a total catch of 567. Significant numbers of white perch and chain pickerel were also harvested. It is hoped that the removal of these predators will reduce the number of fish preying on or competing for food with salmon. If so, the number and condition of salmon should improve.

Additional pike monitoring work at Long Pond will include spring trap netting to determine if winter harvest is having an impact on the spring spawning run of the species. Fewer pike were trap netted in the spring of 2004 than were netted in the mid 1990's. However the size range of fish netted indicate a stable population. Future pike evaluations via angler surveys and trap netting will help determine if winter harvest of pike is leading to the return of trophy landlocked salmon fishing in Long Pond.



*The Northern Pike is a voracious predator, look closely in its mouth.*



## Fishery Region C

### Too Many Wild Togue Causes Problems

Two regional waters, Phillips Lake and Tunk Lake, are currently not producing up to expectations. The main problem is an over-abundance of wild togue that are eating numerous smelt, reducing the number available for stocked salmon.

**Phillips Lake:** The smelt population at Phillips Lake is very low. As numbers of togue, especially smaller fish from 14-18 inches, have increased, numbers of smelt have declined. In an effort to improve the health of the fisheries, we've implemented these actions:

- Liberalized fishing regulations allowing anglers to keep 3 togue per day longer than 14 inches, extended the length of the ice fishing season to 3-months, and allowed anglers to keep 2 salmon per day, only one of which may exceed 18 inches
- Transferred smelt eggs into the lake in April
- Cut the salmon stocking rate in half to reduce the number of predators feeding on smelt

Anglers need to do their part to help improve the fishery. They can do so by keeping their limit of togue and releasing fewer togue and salmon.

**Tunk Lake:** We are managing this lake for large (i.e. fish weighing 3 lbs or more) salmon with a mandatory release 16-20 inch slot limit. Too many wild togue, with 13-17 inch fish especially abundant, have "put a big dent" in the smelt population, necessitating big reductions in the salmon stocking rate. Although Tunk still yields some 3-4 lb salmon, the numbers of such fish are fewer than otherwise would be the case if togue were less numerous and smelt more plentiful. Only two (10%) of the 20 togue caught this summer during a netting survey contained smelt in their stomachs. Our biggest challenge is to convince more anglers of the pressing need to kill more togue. Until such time as that occurs, we don't expect much improvement in the fisheries.

### Cooperative Project Benefits Branch Lake Wild Brown Trout

Branch Lake supports the most significant wild brown trout fishery in the region. Although fishing quality has declined over the past 20 years, the lake still yields some 3-5 lb brown trout. Electrofishing surveys have confirmed that natural reproduction occurs in at least 5 tributaries. The most important of these is the main branch, and eastern branch, of Winkumpaugh Brook. This is a dandy little producer of juvenile brown trout in those years when two important variables are favorable:

- a) summer and late fall flows are good, and
- b) no beaver dams block/restrict access to sexually mature adults.

Unfortunately, streams in Downeast Maine have suffered through an unusually high number of relatively hot, dry summers over the past 12 years. This has resulted in poor production of young fish in Winkumpaugh.

Active beaver dams on a small stream like Winkumpaugh can create problems for trout because:

- 1) they prevent/restrict access of adults to upstream spawning habitat
- 2) the impoundments behind the dams often flood out productive riffle areas favored by juvenile fish, and
- 3) because typical peak spring flows may be insufficient to breach the dams, they may remain in place for years.

Because of the high importance of this valuable wild brown trout population, we have recently partnered with some local citizens and our wildlife colleagues in an effort to keep this brook free of beaver and their dams. Dennis Smith of Otter Creek has taken the initiative to periodically check out the brook in the summer/early fall for the presence of beaver. When he observes some activity, he informs us of the location. Then, we arrange with regional wildlife biologist Tom Schaeffer to issue a special out of season permit for a local trapper to remove the nuisance beaver. In fall, 2003, Lee LaBelle of Ellsworth trapped two beaver, and their dams were subsequently breached. In November, brown trout were able to ascend the brook and spawn successfully as we captured 52 young of the year brown trout during an electrofishing survey on 8/3/04. Similarly, this fall, Tim Billings of Otter Creek trapped 3 beaver, and their dams were breached. The fall rains finally arrived in late November, and I suspect the brown trout took advantage of the increased flow to ascend the brook and spawn. We'll find out by sampling the brook again next August via electrofishing.

This project is a fine example of how cooperation between fishery biologists, citizens, and wildlife biologists can maintain/enhance fish populations.

### Progress In Providing Public Access

Downeast biologists have been working to acquire land to ensure equitable launching and adequate parking for future generations.

**Indian Pond, Whiting:** This 120-acre water is stocked with brook trout and is open to both winter and summer angling. The 4-acre parcel that was purchased has been the traditional launch site and parking area for many years.

**Pocomoonshine Lake Princeton:** Four acres were purchased that abutts the town of Princeton's boat launching facility. This additional acreage provides badly needed parking. In addition to the new paved parking spaces, funds were used to construct a new docking system and concrete launch pad.

**Pennamaquan Lake, Pembroke:** This 1,200 acre lake is producing a fishery for brown trout up to 5 pounds. This new site is located at the end of the Porter Landing Road.

### Splake Fill An Important Niche

This hybrid, lake trout and brook trout cross, holds exciting potential to provide excellent sport fisheries in selected waters where other cold-water species would fail. This been the case at Second Old Stream Lake where water quality is excellent, but competing fish species such as yellow perch, white perch, and pickerel severely limit the success of brook trout. From the initial stockings in the mid

1980's, splake have provided anglers with a consist fishery for 12 to 20 inch fish. Because splake feed extensively on perch, they have thinned out this highly prolific species, and provided a fishery for larger perch.

Splake have enjoyed similar success at Fitts Pond in Clifton. Splake were stocked in place of brook trout in 1997 as brook trout failed to take advantage of available forage and survived very poorly, resulting in low returns to anglers. Splake provide good numbers of 12 to 18 inch fish with some attaining weights of 3 to 3 ½ pounds.

At Mopang Lake in T29 MD, traditional landlocked salmon stockings are being augmented with splake. Where as few salmon attained large size, because of their dependence on one forage item (smelt), splake have taken advantage of a wide variety of forage, especially young white perch, with some reaching weights of 4 ½ to 5 pounds. This, together with a salmon fishery which yields good catches of 14 to 17 inch fish provides an optimum level of fishing diversity. Give this scenic lake a try, you won't regret it!



*Fishery biologist Tim Obrey displays a splake netted in the fall of 2004.*

## Upstream Salmon Passage Restored to West Grand Lake

Using a simple fish sorting device that takes advantage of the landlocked salmon's leaping ability, upstream fish passage into West Grand Lake from Grand Lake Stream was restored in June 2004, after a long hiatus. In the first hour of operation, more than 50 salmon successfully leaped over the jump!

Salmon passage had been curtailed by placement of a fish screen in the fishway entrance from May-June 1981-90 to prevent sea-run alewives from accessing West Grand Lake and potentially adversely impacting the lake's rainbow smelt population.

By 1997, when landlocked alewives appeared in the St. Croix watershed, the fishway entrance was screened year-round to prevent establishment of a permanent population that would strongly compete for zooplankton with the lake's vitally important smelt population. Smelts are the principal food item of the lake's salmon and togue populations.

Domtar Industries, Inc. of Baileyville funded, constructed and installed an adjustable overflow gate that creates a 21" jump near the top of the fishway. Adult salmon leap over this hydraulic jump to migrate upstream, but smaller fish and non-leaping fish like alewives are stopped from further passage. In future years, hundreds of salmon will be able to return to the lake in the months after spawning.

The design was modeled from a similar hydraulic jump used by Atlantic salmon at the Mactaquac Dam on New Brunswick's St. John River.



*Landlocked salmon negotiating the new fish passage device at Grand Lake Stream.*

## Fishery Region D

### Public Access Projects:

**Tibbetts Pond:** in Concord Township will be managed primarily for kid-fishing. After imposing regulations limiting fishing to persons less than 16 years of age and to complimentary license holders, we stocked spring yearling brook trout for the first time in 2004.

**Androscoggin River, Riley Impoundment:** Angler access to the Androscoggin River continues to improve. The Department recently purchased a parcel of land on the Riley Impoundment. This section of the Androscoggin supports an excellent sport fishery for smallmouth bass.

### Mooselookmeguntic Lake Salmon and Brook Trout Management:

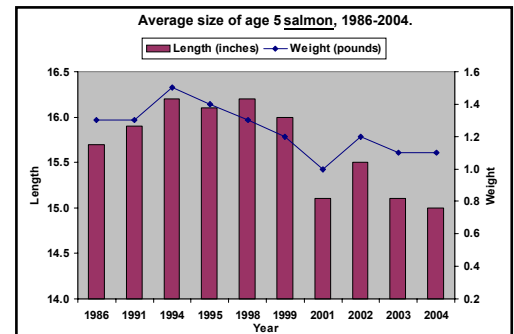
Effective in 2000, salmon regulations for Mooselookmeguntic Lake were changed to restrict the harvest of larger, older fish (longer than 18 inches). The regulation was intended to encourage the harvest of smaller, younger salmon (14 to 18 inches). Fish this size exert a great deal of pressure on smelts, the principal forage. This regulation was proposed because growth rates of both salmon and brook trout were in moderate but steady decline. The decline was coincident with an increase in the proportion of legal fish released by anglers – lower harvest rates resulted in larger numbers of smelt predators.

The effects of the new regulation have been monitored by creel surveys and by sampling the salmon spawning run in the Kennebago River. These surveys show growth rates and body condition for both species have continued to decline. While fish condition remains acceptable, and both sport fisheries remain attractive, we are concerned that conditions in the lake for good fish growth could deteriorate very quickly. This could occur if salmon numbers continue to increase – they are voracious smelt predators, particularly when young. In such a large lake supported entirely by wild fish, the recovery period for smelts could be many, many years.

Our surveys show that instead of selecting smaller salmon to harvest, as the new regulation intended, anglers continue to preferentially harvest large salmon. The same behavior was observed by trout anglers. The apparent reluctance of anglers to harvest young fish has diminished the potential effectiveness of the new regulation.

Because this fishery is supported entirely by natural reproduction, harvest regulations remain our primary tool for reducing the number of predators and maintaining a reasonable balance between them and smelts. Therefore, we're encouraging anglers to increase their harvest of salmon between

14 and 18 inches long (2 fish allowed per day). Over time, this action should improve fishing for both salmon and brook trout.





## Stream Surveys and Restoration Projects:

**South Bog Stream:** The first segment of the South Bog Stream restoration project was completed in the summer of 2004. The stream was degraded by log driving many years ago, resulting in over-widened reaches and a loss of pools. The project consisted of recreating pools and installing log deflectors to narrow the stream. Funding was provided by the Rangeley Region Guides' and Sportsmen's Association, the Trout and Salmon Foundation, and Trout Unlimited. We also continued our monitoring of the Cupsuptic River project, which was completed in 2002.

**Cold Stream:** We surveyed Cold Stream, near The Forks, in July, with the help of a number of biologists from other parts of the state and several members of the Somerset Chapter of Trout Unlimited. We are grateful to Ken and Pam Christopher, President of The Forks Fish and Game Club, who provided complimentary lodging for the survey crew at their C. Moxie Gore Outfitters cabins.

**Other stream surveys:** Members of the Rangeley Region Guides' and Sportsmen's Association came to our aid again this past summer by helping out with stream surveys in the Rangeley area (Martin Brook, Mountain Pond Stream, and Four Ponds Brook) as well as with monitoring assistance on our stream restoration projects.

We're also grateful to the staff at the Embden Rearing Station for their assistance. While the facility is being rebuilt, they provided many days of assistance in the field with stream and lake surveys, nettings, and electrofishing.

Restoration of pools and placement of log deflectors to narrow over-widened reach of South Bog Stream, Rangeley Plt.

**West Carry Pond in Carrying Place Township:** is a trophy brook trout water. We captured 14 wild brook trout ranging in age from 2 to 5 years old. The largest brook trout were a 19¼-inch, 3 lbs. 2 oz. male and a 21½-inch, 4 lbs. 8 oz. female. Newly established regulations should help protect these trout, which are already near their maximum growth capability. During this same time at West Carry Pond, we caught 18 lake trout. They averaged 21¼ inches and 3 lbs. 6 oz. with the largest being a 28-inch, 6 lbs. 6oz. female.

Additional waters will be added to the trophy brook trout water program in the future.



*A fine male brook trout captured at West Carry Pond, October 2004.*

## Spawning Run Surveys:

**Rangeley Lake fishery:** Rangeley Lake provided excellent salmon fishing again this year. An estimated 12,700 anglers fished the lake in 2004 and harvested 1,150 salmon and 270 brook trout. However, they voluntarily released 82% of the legal-size salmon and 67% of the trout they caught. The average size of salmon caught by anglers was 19 inches and 2.4 pounds; that for brook trout was 15 inches and 1.3 pounds. The largest salmon checked was 22.5 inches and 5 pounds; the largest brook trout was 18 inches and 2 pounds.

**Rangeley Lake Trapnetting:** We captured nearly 200 salmon during our annual trapnetting operation at Rangeley Lake outlet. The fish were again in superb condition; the three largest salmon were as follows: 25.9", 6 lb. 13 oz.; 25.8", 6 lb. 4 oz.; and 25.2", 6 lb. 0 oz. A large number of wild salmon were hatched in 2000 and these fish, now four years old, still showed up in large numbers in our fall 2004 sample. Overall, wild salmon accounted for 44% of those sampled during fall trapnetting.

**Jim Pond in Jim Pond Twp:** Trapnetting was also conducted at Jim Pond in Jim Pond Twp. to sample salmon and lake trout. We captured 43 salmon ranging in size from 6½ to 19 inches. Only 21% of these salmon were of hatchery origin. Future stockings of salmon have been suspended to encourage a completely wild population. No lake trout were taken during the two weeks of netting.

**Mooselookmeguntic Lake:** We continued our annual survey of the Mooselookmeguntic Lake spawning run in the Kennebago River. The purpose of this project is to closely monitor the growth and condition of the lake's large salmon population. We captured 109 salmon, the largest weighing in about 5.3 pounds.

## Invasive Species Work:

We've made significant progress in obtaining funds for a variety of invasive fish projects, including several on the Rapid River. The Rapid River Coalition, a consortium of local and statewide angler groups, raised about \$15,000, and the Orvis Company has committed a Conservation Grant for at least \$30,000. Additional money may come from grant proposals made to Maine's Outdoor Heritage Fund. Our priorities for these grants include a study to evaluate the feasibility of manipulating river flows to limit smallmouth bass numbers in the Rapid River, the construction of bass barriers to protect area trout ponds, and studies to determine movements of young trout and bass in the Rapid and Magalloway Rivers. We also



*The Rapid River photo by Shelby Rousseau, RLHT*



hope to hire a Project Manager to administer these projects and to assist us in securing additional funding.

The Rapid River Coalition has already funded an informational sign alerting local anglers to the problem of invasive fish. The sign will be conspicuously posted at all boat landings in the Rangeley Lakes area. Thanks to the Rangeley Region Guides' and Sportsmen's Association, Rangeley Lakes Heritage Trust, Trout Unlimited, Fly Fishing in Maine, and the Lake Associations for Rangeley Lake, Mooselookmeguntic Lake, Kennebago Lake, and Saddleback Lake for their contributions to this project.

## Fishery Region E

### Allagash Stream Survey:

Allagash Stream is the major tributary to Chamberlain Lake, an 11,084-acre water and the largest lake in the Allagash Wilderness Waterway. Chamberlain Lake supports a self-sustaining population of wild brook trout. During the fall of 2004, Region E fishery biologists surveyed a 2-mile section of Allagash Stream from Little Allagash Falls downstream to Chamberlain Lake to evaluate aquatic habitat. We believe that Little Allagash Falls, with a drop of approximately 8 feet, is an impasse to brook trout moving upstream.

The major purpose of the survey was to identify and quantify the amount of suitable spawning habitat available to brook trout and to evaluate the use of this habitat by observing spawning brook trout or evidence of trout redds/nests.

We found eight locations containing suitable spawning gravel within the survey area. We did not observe any brook trout in the stream during the survey; however, we located a total of 50 spawning redds/nests in seven of the eight areas containing suitable spawning gravel.



*Allagash Stream*

The relatively low number of redds/nests we observed raised a few questions. Are we over estimating the amount of "suitable" gravel for spawning within Allagash Stream? Are brook trout spawning in other smaller tributaries to Chamberlain Lake? Is the number of redds we observed representative of the number of adults in Chamberlain Lake? These questions demonstrate the need to continue to closely monitor the wild brook trout population in Chamberlain Lake.

### Lock Dam:

Since the 1840's, Lock Dam at Chamberlain Lake's natural outlet has diverted water from the Allagash River into the East Branch of the Penobscot River through Telos Dam, on the man-made outlet of Telos Lake. Both Lock and Telos Dams are now owned and operated by the Maine Department of Conservation, Allagash Wilderness Waterway.

For the past 40 years, the only water flowing north through Lock Dam into what was historically the Allagash River (now called Martin Stream) and down to Big Eagle Lake has been discharged through a 3-foot culvert. This

culvert is inadequate for several reasons. It is in poor condition. The grate over its entrance plugs with debris, and therefore requires constant cleaning to maintain a flow. At full pond a whirlpool is created over the entrance causing a significant safety concern. The most serious inadequacy; however, is that a constant flow cannot be maintained through this culvert when Chamberlain Lake is drawn down each fall. The fall and over winter dewatering of Martin Stream is detrimental to the aquatic habitat there, and may have contributed to the decline of the lake whitefish population in Big Eagle Lake. After years of oversight we are attempting to correct this situation.

The physical alterations that are necessary at Lock Dam to guarantee appropriate year-round flows downstream into Big Eagle Lake at all Chamberlain Lake levels involve replacing the 3-foot diameter culvert with a sluiceway that includes a gate that can be operated manually. The sill elevation of the new sluiceway must be the same as the sill elevation of Telos Dam. This will require up to 2 feet of excavation in the area immediately in front of this new sluiceway. In addition to providing a constant minimum flow to Martin Stream, the changes proposed will also allow flow management to provide annual spring "freshet" flows, and flows to attract adult fish prior to spawning.

Restoring and maintaining a year-round flow in Martin Stream will improve the aquatic habitat there, and provide a spawning area for the lake whitefish population in Big Eagle Lake. A year-round flow through Lock Dam may also provide additional recreational benefits downstream in the Allagash Waterway. We believe that this proposal will have little effect on flows through Telos Dam into the East Branch of the Penobscot River.

IF&W personnel are working with the Department of Conservation, other appropriate State and Federal governmental agencies, as well as the groups interested in preserving the AWW to resolve this problem and restore a year-round flow below Lock Dam.

### Moosehead Lake Update

Fishing for lake trout during the 2004 ice fishing season was a little slower than in previous years, but angler success at catching lake trout from Moosehead remained well above the regional average. Anglers experienced better fishing early in the season, as opposed to later in March, a trend we have observed in recent years. Despite the regulations which allow 5 lake trout over 14 inches in the daily bag limit (including only one over 18 inches), Moosehead's lake trout population remains higher than desirable to produce the number of salmon that anglers would also like to see.

During the ice fishing season lake trout are vulnerable to anglers throughout the season in most areas around Moosehead Lake. Therefore the winter months provide the



*Looking downstream from Lock Dam at Chamberlain Lake.*

best opportunity for anglers to target lake trout, take advantage of the liberal regulations, and harvest this abundant resource. Lake trout, especially those less than 18 inches, will continue to provide good fishing in 2005 for those who are looking for action, especially through the ice. We encourage folks who want a productive day of lake trout fishing to come to Moosehead.

The success of Moosehead Lake's open water season hinges on the quality of the salmon fishing. During the summer of 2004 we received many reports of good salmon fishing. Although the average size of the salmon harvested remains slightly below our objective of 17-inches, fish over 18 inches were well represented in the open water season catch. Improvements in both salmon growth and salmon abundance will depend on the success of efforts to reduce lake trout abundance.

Fishing in the rivers associated with Moosehead also depends on the Lake's salmon population. Fishing in 2004 on the Moose, the Roach, and the East Outlet was slower than average, but the size quality of the salmon improved, a very encouraging sign.

Capture Site	Percent LLS >18 in.	Percent LLS >20 in.
Moose River	48%	20%
Roach River	55%	23%
East Outlet	33%	13%

Smallmouth bass were illegally introduced into Moosehead Lake in the mid 1970's. Due to environmental conditions it has taken them 25 years to gain a foothold. In June of 2004,

Moosehead Region fisheries personnel followed up on reports of increasing numbers of smallmouth bass being caught in Lily Bay. In 2 days of angling along the shore of Lily Bay, 4 anglers boated 60 smallmouths that averaged 12.7 inches. Bass



*Smallmouth bass collected from Moosehead Lake, 2004.*

over 3 pounds in weight were caught, ending any doubt that Moosehead's bass are well established, if only locally, around the lake. Although smallmouths will add to the diversity of fishing opportunity on Moosehead, they will do so at the expense of the lake's native brook trout.

### Bass Reported in Misery Pond:

This fall, Region E staff received a report from Game Wardens that two anglers had reported catching smallmouth bass in Misery Pond. Misery Pond, a 36-acre supporting a wild brook trout population, is located at the headwaters of Misery Stream, one of Brassua Lake's tributaries. These were the first reports of bass caught in the Moose River drainage.

In response to the reports, Region E staff and Fishery Research personnel spent the first week of October at Misery Pond trying to document the presence of bass, and to eradicate them if possible. The effort included trapnetting,

electrofishing along the shore, gillnetting, and minnow trap sets. No bass were caught or observed during the campaign. Unfortunately, this may not indicate that bass are not present in Misery Pond. By the time Region E staff received these reports and could react, water temperature had dropped to 50°F. Any bass present would likely have ceased activity for the winter at that temperature and moved into deeper water. Region E staff will return next spring when water temperatures reach 50°F to continue our investigation to determine if an illegal introduction has occurred.

If smallmouth bass are present, and have not migrated downstream or reproduced, given the size of Misery Pond, we may be able to eliminate them. If smallmouth bass have established downstream, much of the 700 square miles of Moose River drainage above Brassua Dam is vulnerable.

## Fishery Region F

### Pleasant Lake, Island Falls

This deep, well-oxygenated water supports a large population of rainbow smelt, critical to quality salmon growth.

Pleasant Lake has been managed for size quality of salmon and brook trout. There has been a 1 salmon limit in effect at Pleasant since the early 1990's with very desirable results. A winter creel survey in 2001 illustrated the present high quality salmon fishery that we are producing with the low bag limit. Clerks measured 93 landlocked salmon, with a mean length at harvest of 19.1 inches and 2.41 pounds.

At present, 69.9% (65/93) of all salmon harvested are 18" or more with a one salmon limit, and a large number of legal salmon are released during the summer and winter seasons. During the 2001 winter season, clerks measured 7 salmon that were 4 pounds or better, and 3 of those were over 5 pounds.

Pleasant Pond also provides an excellent brook trout fishery supported with hatchery production from the Cobb Fish Hatchery from Enfield. Mean length and weight of (two) year old brook trout in the fall of 2004 was 17.0 inches and 2.3 lbs.

This Department and The Sportsman's Alliance of Maine will be addressing management issues as part of Maine's Classic Salmon Initiative.

### Spednic Lake Bass Restoration

Spednic Lake is a large, 17,219-acre, lake in the St. Croix River drainage. The lake is on the border between Maine and New Brunswick, Canada. This lake has had a long history of producing a superior smallmouth bass fishery. A fisheries lake survey report written in 1972 stated "The fishery for smallmouth bass is exceptionally good, as has been noted in several nationwide outdoor magazines over the years". In the early 1980's anglers reported an apparent decline in the numbers of smaller bass being produced and were concerned about the future of the bass fishery. Investigations by regional fisheries personnel soon revealed that although large numbers of bass fry were being produced in the spring, very few survived through the summer season into the fall. It was also found that huge numbers of sea run alewives were entering the lake because of recent fishway improvements in the lower river. The adult alewives were



spawning in Spednic Lake and producing millions of young alewives every summer. Water quality studies showed that the lake was not able to produce enough food to sustain both bass and alewives. Natural mortality and harvesting of older fish combined with the lack of younger fish growing to maturity gradually depleted the spawning population of bass. In the late 1980's the lake was closed to the taking of bass, the fishway was closed which prevented alewives from entering the lake, and adult bass were transferred to Spednic from other Washington County lakes. As a result of these actions, removal of adult bass was stopped, spawning increased, and survival of young bass improved greatly. The bass population in Spednic has rebounded and the lake is once again producing an excellent bass fishery.



*A fine Region F smallmouth bass.*

### Penobscot River Restoration Project

In June 2004 an agreement between a coalition called the Penobscot River Restoration Trust and PPL, the owner of most of the dams on the lower Penobscot River, was completed and signed. The agreement will allow the Trust to purchase three PPL owned dams and will permit PPL to increase power production at its remaining dams. Two of the purchased dams will be removed, the Veazie dam and the Great Works dam in Old Town. The third dam, the Howland dam, will remain in place but will not produce power and a stream will be built around the dam to provide improved fish passage. The purpose of the project is to improve conditions for the restoration of anadromous fish species in the Penobscot River. Anadromous fish that cannot negotiate



*Veazie Dam on the Penobscot River.*

fishways, such as striped bass and sturgeon, will be able to use the River up to Milford and passage for other species will be greatly improved by the removal or alteration of the dams. Fisheries biologists from IF&W will be working with

Penobscot River Restoration biologists to

identify potential conflicts between resident inland fisheries and anadromous species being restored and finding ways to resolve potential conflicts.

### The Spread of Introduced Species within Region F

The first report of largemouth bass in Region F occurred in the Cambolasse Stream Drainage of Lincoln in the early '90's, and this summer largemouth bass were electro-fished in the Penobscot near the town of Lincoln. In 2002 Inland

Fisheries and Wildlife confirmed the presence of largemouth bass in Nicaus Lake.

Smallmouth bass were reported and confirmed in Jo Mary stream between Upper and Lower Jo Mary Lakes, as well as both Upper and Lower Shin Ponds. We have also had reports of largemouths being caught in the West Branch of the Penobscot River, the East Branch of the Penobscot River above Grand Pitch, Pemadumcook Lake and Millinocket Lake.

The first northern pike reported in Pushaw Pond was caught in 2003 and weighed 6 lbs. Last summer an angler reported catching a 19 inch northern pike in Pushaw Pond in Old Town and our summer assistant confirmed it. We've had several other reports of pike being caught in Pushaw and in the Penobscot River below Veazie, but these were not confirmed.

Although illegal introductions of game-fish receive the most attention, introductions of non-game and minnow species are also occurring. Some of these are intentional and some are a result of fish being released from bait buckets.

Last summer in Region F, as a part of the summer lakes survey work on regional waters, 10 new species were identified.

## Fishery Region G

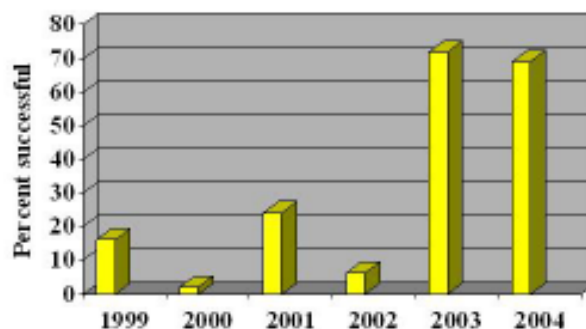
### Squapan Lake, A Success Story in Central Aroostook County:

Squapan Lake is a 5,000 acre-plus impoundment that supports low wild populations of brook trout and salmon due to the intense competition with yellow perch, white sucker, fallfish and several other species of non-sport fish. Consequently, our fisheries management program has relied heavily on stocking. Salmon, brook trout, and splake programs have been tried in the past. Unfortunately, many of these programs have failed to provide viable, long-term fishing opportunity.

An exception to the lack of viable wild fisheries is the spring dip netting and winter hand-line fisheries provided by the lake's rainbow smelt population.

Splake have provided the latest success story at Squapan. From 1999 to 2004 angler pressure increased 44 percent at Squapan, a direct result of improved fishing success that resulted from stocking fall yearling splake that began in 2002.

**Angler Success in Catching Splake in Squapan Lake**



Since 2002, angler success has increased from about 12 percent in the four years preceding the change to fall yearling splake to about 71 percent in 2003-2004. Size of the splake caught is another reason this fish has proved so popular at Squa Pan. Average size was 16.3 inches and 1.6 pounds over the past two years.

### Protecting the Fish River Ecosystem:

Evaluation of the lower Fish River Falls as a barrier to upstream movement of muskellunge and smallmouth has been completed. In a report submitted to IF&W by the U.S. Army Corps of Engineers in December 2003, the falls is described as not being a blockage to these species in its existing configuration. The preferred recommendation is to widen the tailrace from the existing 42-foot opening to a minimum opening of 77 feet. In conjunction with this, the lower step of the falls will need to be removed in order to deepen the river channel. Implementing these recommendations should prevent muskellunge and smallmouth bass from jumping the falls at flow rates from 0 to 15,000 cfs. Cost to do this work is estimated at nearly \$500,000.

At a public meeting held at Fort Kent in June 2004, the consensus of the public and government officials was for IF&W to work with private landowners on providing access to the west side of the falls and to seek environmental permits to implement the recommendations.

### Big Hudson Brook Habitat Improvement, 46 Years Later:

During the middle part of the 20<sup>th</sup> century, streams and rivers across Maine were used extensively for moving wood products, often called "river-driving". In preparation for "drives", dams were built on lakes and ponds for water storage and bulldozers were used to straighten and clear obstructions from streams and rivers.

Prior to 1960, the State of Maine began to restrict bulldozing in streams based on data gathered by the Inland Fisheries and Game Department which indicated that driving wood was extremely destructive to fish habitat and fish populations. Over the next decade, river driving was phased out.

Big Hudson Brook is located in T10R10, Piscataquis County, at the headwaters of the Aroostook River watershed. In the 1950s, local anglers considered Big Hudson Brook one of the best trout brooks in northern Maine. Bulldozing in



*Hudson Brook Stream degradation.*

1950 essentially destroyed fish habitat in Big Hudson Brook.

The brook was widened up to five times its natural width with no defined channel at low flows. Shade trees along the bank had been removed, and water temperatures reached the mid-seventies. Pools and in-stream cover were almost completely eliminated.

In 1956, fisheries biologist Kendall Warner and district game warden Ivan Porter worked with Great Northern Paper

Company to improve fish habitat in Big Hudson Brook.

Seventy-one wing deflectors, 10 rock dams, and 6 spring holes were constructed over approximately 7 miles of Big Hudson Brook. The objectives of the new structures were to narrow stream flow, create pools, create a diversity of habitat, and create summer habitat for trout.

In 2002, 46 years after construction, the improvements in Big Hudson were evaluated.

The least effective method over this long term was excavated spring holes: only one spring hole was still functioning in 2002. Thirty-seven wing deflectors (52%) and four rock dams (40%) were still intact and functioning in 2002.

Results of this study indicate that, absent intervention, these streams may still be degraded with respect to fish habitat, and fish production in these waters may be much lower than it was historically.

### Glazier Lake Winter Sport Fishery:

In 2004, MDIFW conducted a winter creel survey at Beau and Glazier Lakes. Few anglers and no muskellunge were observed at Beau Lake. Angler use at Glazier Lake was estimated at about 900 anglers. Twenty-one per cent of the anglers were successful at catching a muskellunge, 7% a togue and 2% a salmon. Musky averaged 32.6 inches (range = 24-43 inches) and 10.1 pounds. (range 24-43 inches). Togue averaged 19.1 inches and 2.3 pounds. For the season, 89 musky and 35 legal togue were estimated to have been harvested. Kim Massie of Smyrna caught a new state record muskellunge. The fish measured 43.9 inches and weighed 27 pounds. The presence of muskies in this drain is a serious threat to native brook trout.

### Lake Whitefish Restoration:

An assessment of the lake whitefish sport fishery during the recent update of the comprehensive statewide management plan for inland fish species indicated a species in decline. In the 20 years from 1981-2001, there has been a 15% reduction in the number of lake whitefish waters. It is projected that over the next 5 years the number of waters could decline by an additional 17%.

IF&W has embarked on an experimental hatchery program to restore LWF sport fisheries in lakes where historic populations are considered low or are now absent. A 16-inch minimum length limit on whitefish was established on several northern Maine waters to protect whitefish from harvest until they had spawned at least once. Furthermore, several waters were closed to the taking of whitefish in a more drastic approach to restore LWF populations. These include four of the waters stocked in 2003: Big Eagle, Churchill, Spider and 2<sup>nd</sup> Musquacook Lakes, as well as 1<sup>st</sup> and 3<sup>rd</sup> Musquacook Lakes. The IF&W Advisory Council approved both of these recommendations for the 2005 fishing season.



*Lake Whitefish grown at the fish cultural station in Enfield.*



In the fall of 2003 fingerling LWF at a size of 3.5-4.0 inches were released into 5 northern Maine lakes: St. Froid in Aroostook County and 2<sup>nd</sup> Musquacook, Spider, Big Eagle, and Churchill in Piscataquis County. Prior to stocking, the fish were marked with a fin clip for immediate identification in the field. The contribution of hatchery LWF to the fishery will be monitored from creel survey information and biological sampling.

Unfortunately, we were unsuccessful in obtaining lake whitefish eggs in the fall of 2003 so no whitefish were available for stocking in 2004. Eggs were collected in November 2004 and, consequently, several waters will again be stocked in the fall of 2005.

### **Durepo Lake: Biological Terrorists Strike Again:**

In early October 2001, Durepo Lake, its tributaries and outlet, were treated with rotenone in an attempt to eradicate an illegal stocking of largemouth bass. This action was undertaken to protect native brook trout habitat from this invasive fish species.

It has cost IF&W over \$70,000 since 2001 to provide a brook trout sport fishery that prior to the illegal introduction of largemouth bass was sustained by wild trout at no cost to the Department!

Unfortunately, in July 2004, biologists received an angler report of the presence of bass in Durepo Lake. Four bass averaging 4.2 inches in length and 1 year of age were collected by Fishery Division staff in the lake near the outlet. Several other bass were observed swimming along the shoreline. Upon close examination these fish were identified as smallmouth bass, not the largemouth bass that had been targeted for eradication in 2001.

Based on available information, we believe the perpetrator of this illegal action stocked prespawning smallmouth bass into the lake in early summer of 2003. The bass we collected would be the offspring of adult fish planted in 2003. Apparently, our rapid response to protect wild brook trout habitat was thwarted a little more than a year after we took action.

## **Hatchery Lab:**

### **Improving Brook Trout Egg Quality in Maine**

The Maine Department of Inland Fisheries & Wildlife (MDIF&W) annually stocks approximately 965,000 eastern brook trout, *Salvelinus fontinalis*, into several hundred waters statewide. Although the Department's nine hatcheries also rear other species, brook trout are the department's largest commodity. Like many other hatchery systems in the northeastern United States, the increasing cost of maintaining brook trout brood fish has necessitated improvements in the hatchability of brook trout eggs. Brook trout eggs from Maine hatchery reared brood fish have tended to be very fragile. Incubating eggs would become opaque without apparent cause. Developing embryos within these eggs ultimately died. Years of unpredictable brook trout egg viability resulted in compensatory management decisions to increase broodfish numbers, to keep broodfish at multiple hatcheries, and even contributed to the development of a new heritage brook trout strain (Kennebago) created by

capturing brood fish from a wild population. However, when the same egg viability problem persisted in the new heritage strain, it became necessary to determine the problem's underlying cause.

MDIF&W's Fish Health Laboratory began examining the possible causes of poor egg viability including: poor husbandry, infectious bacteria, viral, or parasitic disease, nutritional disease, genetic disease, and water quality. Genetic disease seemed unlikely since both the domesticated and heritage strains were affected; therefore, efforts were concentrated on other potential causes. Ultimately, our studies indicated that the problem was most likely a water quality or nutritional problem. Developing egg samples were systematically collected every 48 hours, preserved and then examined by dissecting microscope. These observations revealed that mortalities occurred before formation of a notochord after which mortality was minimal. A calcium:phosphorus imbalance appeared to be a possible cause because calcium is important in fish eggshell physiology and calcium is low in our hatchery waters.

Unlike terrestrial mammals, salmonids (trout and salmon species) rely on their skin and gills for at least 50% of their calcium uptake rather than their food. In addition to their respiratory functions, the gills contain specialized chloride cells that excrete metabolic wastes and uptake  $\text{Ca}^{2+}$ . Thus, most freshwater fishes as well as saltwater fishes have access to a continuous supply of calcium, and their main problem seems to be the limitation of calcium entry. However, in some places, including Maine, calcium levels in the water supply are very low. Low water calcium concentrations cause severe disruption of internal body-ion balances and appear to affect brook trout reproductive success.

During the 2003 spawning season, MDIF&W had success in improving brook trout egg viability by decreasing broodstock density, using younger broodfish age classes and adding a small amount of calcium to hatchery water. Brook trout egg quality improved about 3-fold after either calcium carbonate or calcium chloride was added to hatchery water. This was achieved by adding only a small amount of calcium chloride to water at the Phillips State Fish Hatchery. Similar results were achieved at other MDIF&W fish hatcheries by lightly dusting raceway bottoms with ground calcium carbonate. MDIF&W plans to repeat the study during the 2004 spawning season.

This study is being supported through a Morris Animal Foundation grant to help scientifically document the effects of adding calcium to the hatchery water.



*Fish Culturist Steve Tremblay taking salmon eggs at Sebago Lake.*

## Research Section:

### Volunteer Stream Survey Program:

Maine has thousands of miles of streams and rivers. Only a small fraction of these waters have been surveyed to learn what fishery and habitat resources exist. In partnership with the Stream Team program at Maine DEP, the Fisheries Research Section has created a training program to provide volunteers with basic stream survey skills. IF&W research biologists participated in three Stream Team training sessions in 2004 with the Izaak Walton League, Trout Unlimited, and Central High School volunteers. The training teaches the basic survey knowledge necessary to accurately fill out a Volunteer Stream Habitat Survey form. The six-page protocol records data on basic habitat characteristics, water quality, ecological impacts, biological data, and a Rapid Geomorphic Assessment. These data are entered into a mappable database with the goal of eventually making the information accessible on the Internet.

Once volunteers are trained in the technique, the survey protocol is quite easy to perform. We encourage stream anglers, canoeists and kayakers to participate as this protocol can provide valuable information regarding stream condition while they are enjoying a day of fishing or other recreational activities! The program also offers participants and families the opportunity to learn a little stream ecology and become involved in the stewardship of Maine's streams. The technique is extremely useful in providing some baseline information on stream habitat resources, as well as identifying potential problem areas for further scrutiny. Seven stream surveys were carried out in 2003, and volunteers completed 42 in 2004!

With growing interest from sporting groups and an expanding base of trained volunteers, the stream monitoring program shows a lot of promise for gathering significant statewide stream habitat information.



*Commissioner Dan Martin and Fishery Biologist Frank Frost with a nice Long Lake landlocked salmon.*

### Investigating the intensive culture of rainbow smelt:

The Research Section continues collaborative efforts with University of Maine researchers into the culturing of rainbow smelt. Our project goal is to provide a feasible method for people to rear their own smelt to use or sell as live bait. Past efforts have identified two major stumbling blocks in smelt culture that have largely prevented success. First, larval smelt are notoriously difficult to feed and require live rotifers, a type of zooplankton, as their primary food source. In 2004, we fed various live zooplankton organisms to larval smelt to see what is best for smelt survival and growth at differing stages. Larval smelt also require very specific environmental and water quality conditions in order to survive and grow.

All in all, the 'smelt team' conducted numerous experiments in 2004 that investigated many aspects of larval smelt

culture. Some trials tested various food items or feeding protocols. And some experiments tested the effects of environmental variables, such as lighting regime, temperature, or water clarity to see what conditions are best for growing larval smelt. There is still a LOT to learn about culturing smelt, but we made significant progress in 2004. The research team appears ready for the next phase of the project - weaning the young smelts onto a dry diet and growing them to baitfish size!

### Brook Trout Stream Monitoring Project:

Since 1990, the Fisheries Division has conducted a long-term wild brook trout monitoring project. Certain stream sections are electrofished annually to assess wild brook trout condition and numbers, as well as to document any changes in habitats or other species.

Sixty-two stream sites have been surveyed as part of this project and seven of these are long-term monitoring sites that have greater than ten years of data collected. The average size of a 'Maine stream brook trout' is about 3.5 inches long and weighs just under a half ounce with a Fulton's K factor of 0.92. Fulton's K factor is a relationship between fish length and weight that tells whether a fish is 'plump' or 'skinny', the higher the number – the greater the 'plumpness'. This is a reflection of the fish's overall body condition. Stream brook trout tend to be on the skinny side compared to brook trout living in lakes, where condition factor is around 1.0. This is a reflection of the environment they inhabit that favors a more streamlined body form in flowing waters.

This on-going study has also given us the opportunity to investigate the ecological changes brought about by the intrusion of non-native species into some of these wild trout streams. One site in particular, Rome Trout Brook, has documented the invasion and persistent presence of northern pike into this native trout stream and offers a unique opportunity to monitor the changes that result with the addition of unwelcome invaders. This site may also offer an opportunity to test various techniques for controlling pike in trout streams. Future analyses will investigate whether various environmental variables, such as climate trends, affect brook trout populations.

### Hydroacoustics Program:

One of the primary responsibilities of the Lakes Research crew is the new hydroacoustics program. Hydroacoustics is the science of using sound waves to locate and count fish, much like a fish-finder. However, this high-tech equipment can detect very small fish and accurately determine the size of each fish. The Fisheries Division uses this information to assess smelt populations in Maine's lakes.

As the sun sets, the schools of smelt begin to separate in the water column, allowing the equipment to count each individual fish. We set the transducer over the side of the boat and it is towed as we follow the routes. A laptop computer records each individual "ping" or fish that is detected. It also records the size and location of the fish. We use a trawl net to catch a representative sample of fish later in the night. The fish are identified, counted, and weighed.

This information is used to estimate the number of fish (smelts) in the lake. The data will enable us to investigate



the relationship between smelt densities and salmon (and lake trout) growth rates and will, ultimately, lead to improved fisheries for these species.

#### Brook Trout Strain Evaluation Study:

The Lakes Research crew is responsible for coordinating a study to evaluate the performance of the various strains of brook trout stocked in ponds by the Maine Department of Inland Fisheries and Wildlife. Several study waters were selected from around the State and fieldwork is shared between the regional and research staff. The goal is to determine which strain survives, grows and contributes to the fishery the best.

This spring we trapnetted Ten-Forty Pond to determine over-winter survival of recently stocked trout. The total estimate for the pond was 965 fish at the start of the fishing season. We found that nearly 100% of our hybrid strain, the F1 strain and 95% of the Kennebago strain survived the winter. Only 35% of the Maine Hatchery Strain (MHS) survived the winter. This is significant to the Fisheries Division because we had primarily stocked traditional MHS trout in the past. We may have effectively tripled our stocking rates on some waters by switching to one of the new strains. This could have implications for growth and fishing success. We would like to acknowledge the Fish America Foundation for graciously awarding the Fisheries Division a \$10,000 grant to purchase the equipment necessary to conduct this research.

#### New Lake Surveys:

One of the duties of the Fisheries Division is to inventory the nearly 6,000 lakes and ponds in the State and assess their potential for fisheries management based on physical and biological characteristics. To date, we have around 2,100 surveyed waters in our database. The Lakes Research crew assists the regions by completing new lake surveys each summer. Most of our work is focused on the northwestern areas of the State where many of the small, remote unsurveyed waters are located. These waters are usually very remote and require hiking and/or ATV's to access. Carrying a canoe is not usually an option, so we pack in an inflatable boat to conduct fish sampling and water quality.

Our immediate goal is to identify waters that could be enhanced, through regulations or stocking, to create additional fishing opportunities for Maine anglers. For example, waters that have existing wild trout fisheries could be candidates for special regulations. Most unsurveyed waters are managed under General Law. Some of these waters may have the potential to provide higher quality fisheries.

We are also very interested in identifying waters that may not have wild trout but would be suitable for sustaining a fishery through stocking. These types of ponds offer a unique opportunity to create additional high-quality trout fisheries in Maine. The Department has created some superb fisheries, where trout over 16 inches are common, by stocking some of these waters at low rates. These types of trout ponds that have little or no competition can play an important role in this Department's effort to expand trophy trout fishing opportunities.

#### Quality Salmon Initiative Grant

The Sportsman's Alliance of Maine and the Department of Inland Fisheries and Wildlife have just received a grant from the Maine Outdoor Heritage Fund. The grant will be used to help the Fisheries Division actualize their goals on Maine's "Size Quality" salmon waters, in an effort to produce more large salmon on select waters.

John Hunt has been selected as the "Project Coordinator." He has a degree in Environmental Science, was a science educator for many years, and has developed some positive working relationships with fisheries biologists in the Department.

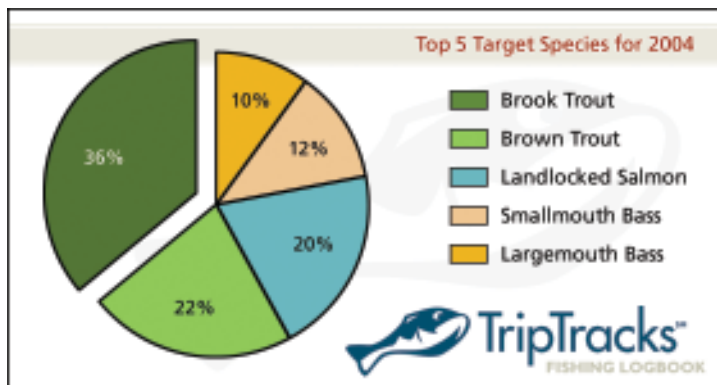
By working in a close partnership with the regional biologists, the "project coordinator," will help inform, educate, promote and publicize the "management tools" necessary to make this type of a fisheries a reality. The project coordinator will also assist in the organization of volunteer groups, and act in a liaison role between the Fisheries Division and SAM's Fishing Initiative Committee.



10 lb. landlocked salmon taken from Long Lake in St. Agatha

#### TripTracks

In 2004 MDIF&W partnered with TripTracks, Inc to bring Maine anglers a new free online Fishing Logbook service. Almost 3000 trips were logged by over 700 anglers, making the initial launch quite a success. The chart below shows a sample of the information captured by the new Internet based system, identifying most popular target species of the users. Check out the site at [www.triptracks.com](http://www.triptracks.com) so you can log your trips and benefit Maine's fisheries!



## Noteworthy Fish Caught in 2004\*

Angler Name	Address	Species	Weight (lbs)	Water Name	Date Caught
Deschene, Jarad	Wales, ME	Brook Trout	4.30	Eagle Lake	5/19/04
Ladd, Robert D.	Sebago Lake, ME	Brook Trout	4.12	Moosehead Lake	6/11/04
Lausier, Richard L.	Brentwood, NH	Brook Trout	4.18	Umbagog	3/5/04
Pomeroy, Cory	Winslow, ME	Brook Trout	4.15	Foss Pond	6/19/04
Pomeroy, Cory	Winslow, ME	Brook Trout	4.48	Foss Pond	6/19/04
Veilleux, David	Fairfield, ME	Brook Trout	5.50	Moosehead Lake	6/11/04
Langergren, David	Limington, ME	Brown Trout	7.73	Not Provided	4/29/04
Sherman, Richard	Springvale, ME	Brown Trout	12.00	Square Pond	5/31/04
Wallace, Robert A.	So. Casco, ME	Lake Trout (Togue)	17.62	Sebago Lake	8/30/04
Fecteau, Dennis	Standish, ME	Lake Trout (Togue)	18.09	Sebago Lake	2/21/04
Gonyea, Scott	So. Portland, ME	Lake Trout (Togue)	15.99	Sebago Lake	1/25/04
Windrush, Peter	Casco, ME	Lake Trout (Togue)	15.00	Sebago Lake	5/5/04
Picard, Scott	Madawaska, ME	Landlocked Salmon	7.88	Not Provided	1/18/04
Poland, Scott W.	Westbrook, ME	Landlocked Salmon	8.56	Trickey Pond	3/23/04
Donald, Alan	Falmouth, ME	Largemouth Bass	7.00	Moose Pond	4/30/04
Masse, Kim	Smyrna, ME	Muskellunge	27.00	Glazier Lake	2/1/04
Pelletier, Dan	Fort Kent, ME	Muskellunge	22.63	Glazier Lake	2/7/04
Pelletier, Jay	Orrington, ME	Muskellunge	22.25	Glazier Lake	2/7/04
Pelletier, Melford	Wallagrass, ME	Muskellunge	16.50	St. John River	5/23/04
Perreault, Bob	St. Francis, ME	Muskellunge	18.70	Glazier Lake	1/17/04
Harkins, Lynwood	Albion, ME	Northern Pike	18.00	North Pond	2/25/04
Juskewitch, Jason	Norridgewock, ME	Northern Pike	17.20	Long Pond	2/14/04
Mea, Arthur A.	Clinton, ME	Northern Pike	21.00	North Pond	3/10/04
Rackleff, Richard	Rome, ME	Northern Pike	16.00	Great Pond	1/13/04
Rackleff, Richard	Rome, ME	Northern Pike	16.76	Great Pond	1/18/04
Rackleff, Richard	Rome, ME	Northern Pike	20.67	Great Pond	2/11/04
Raymond, Chris	Winslow, ME	Northern Pike	15.12	Messalonskee	2/18/04
Weeks, Chris	Oakland, ME	Northern Pike	15.25	Messalonskee	7/14/04
Pease, Danica	Appleton, ME	Pickeral	5.24	Round Pond	2/29/04
Bozza, Peggy Seymour	Cranford, NJ	White Perch	1.40	Long Pond	7/15/04
Hillert, Edward	Albrightville, PA	White Perch	1.63	Long Pond	6/20/04
Jandreau, Britney	Waterville, ME	White Perch	1.93	Not Provided	2/15/04
Michaud, Colby	Fairfield, ME	White Perch	1.93	Lake George	2/8/04
Pierce, Ralph	Skowhegan, ME	White Perch	1.50	Lake George	1/1/04
Basley, Peter T.	Bass Harbor, ME	Whitefish	4.50	Eagle Lake	3/5/04

\*provided by the Maine Sportsman